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# USATHAMA

U.S. Army Toxic and Hazardous Materials Agency

## Enhanced Preliminary Assessment Report:

### Midway Army Housing Units Kent, Washington



November 1989

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prepared for

Commander  
U.S. Army Toxic and Hazardous Materials Agency  
Aberdeen Proving Ground, Maryland 21010-5401

prepared by

Environmental Research Division  
Argonne National Laboratory  
Argonne, Illinois 60439

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## SUMMARY

The Midway (Nike Manor) housing area located in Kent, Wash., does not present an imminent or substantial threat to human health or the environment. There is no evidence to suggest that hazardous or toxic constituents have ever been released from this property. No immediate actions, therefore, are warranted for the site.

This property was originally developed in support of a Nike missile battery. All available documentation and circumstantial evidence suggest that the housing property was wholly independent of the battery's operational activities. No Nike-related wastes were delivered to this property for management or disposal. Furthermore, since this property was independent of the Nike missile operations with respect to all necessary utilities, there is no possibility of the migration of Nike-related wastes along buried utility lines.

The following action is recommended prior to release of the property:

- Remove and replace all 32 underground storage tanks; sample soils in the tank excavations for petroleum contamination and remediate any problems encountered.

This recommendation assumes that the property will most likely continue to be used for residential housing.

## 1 INTRODUCTION

In October 1988, Congress passed the Defense Authorization Amendments and Base Closure and Realignment Act, Public Law 100-526. This legislation provided the framework for making decisions about military base closures and realignments. The overall objective of the legislation is to close and realign bases so as to maximize savings without impairing the Army's overall military mission. In December 1988, the Defense Secretary's ad hoc Commission on Base Realignment and Closure issued its final report nominating candidate installations. The Commission's recommendations, subsequently approved by Congress, affect 111 Army installations, of which 81 are to be closed. Among the affected installations are 53 military housing areas, including the Midway Nike Manor housing area addressed in this preliminary assessment.<sup>1</sup>

Legislative directives require that all base closures and realignments be performed in accordance with applicable provisions of the National Environmental Policy Act (NEPA). As a result, NEPA documentation is being prepared for all properties scheduled to be closed or realigned. The newly formed Base Closure Division of the U.S. Army Toxic and Hazardous Materials Agency is responsible for supervising the preliminary assessment effort for all affected properties. These USATHAMA assessments will subsequently be incorporated into the NEPA documentation being prepared for the properties.

This document is a report of the enhanced preliminary assessment (PA) conducted by Argonne National Laboratory (ANL) at the Army stand-alone housing area located in Kent, Wash.

### 1.1 AUTHORITY FOR THE PA

The USATHAMA has engaged ANL to support the Base Closure Program by assessing the environmental quality of the installations proposed for closure or realignment. Preliminary assessments are being conducted under the authority of the Defense Department's Installation Restoration Program (IRP); the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), Public Law 91-510, also known as Superfund; the Superfund Amendments and Reauthorization Act of 1986, Public Law 99-499; and the Defense Authorization Amendments and Base Closure and Realignment Act of 1988, Public Law 100-526.

In conducting preliminary assessments, ANL has followed the methodologies and procedures outlined in Phase I of the IRP. Consequently, this PA addresses all documented or suspected incidents of actual or potential release of hazardous or toxic constituents to the environment.

In addition, this PA is "enhanced" to cover topics not normally addressed in a Phase I preliminary assessment. Specifically, this assessment considers and evaluates the following topical areas and issues:

- Status with respect to regulatory compliance,
- Asbestos,
- Polychlorinated biphenyls (PCBs),
- Radon hazards (to be assessed and reported on independently),
- Underground storage tanks,
- Current or potential restraints on facility utilization,
- Environmental issues requiring resolution,
- Health-risk perspectives associated with residential land use, and
- Other environmental concerns that might present impediments to the expeditious "excessing," or transfer and/or release, of federally owned property.

## 1.2 OBJECTIVES

This enhanced PA is based on existing information from Army housing records of initial property acquisition, initial construction, and major renovations and remodeling performed by local contractors or by the Army Corps of Engineers. The PA effort does not include the generation of new data. The objectives of the PA include:

- Identifying and characterizing all environmentally significant operations (ESOs),
- Identifying property areas or ESOs that may require a site investigation,
- Identifying ESOs or areas of environmental contamination that may require immediate remedial action,
- Identifying other actions that may be necessary to address and resolve all identified environmental problems, and
- Identifying other environmental concerns that may present impediments to the expeditious transfer of this property.

### 1.3 PROCEDURES

The PA began with a review of Army housing records located at Fort Lewis, Wash., on August 21, 1989. A site visit was conducted on August 22, 1989, at which time additional information was obtained through direct observation and interviews with personnel familiar with the property and its operations and history. Photographs were taken of the housing units and surrounding properties as a means of documenting the condition of the housing units and immediate land uses. Site photographs are appended.

All available information was evaluated with respect to actual or potential releases to air, soil, and surface and ground waters.

Access to several of the individual housing units was obtained through the cooperation of regional Army personnel.

## 2 PROPERTY CHARACTERIZATION

### 2.1 GENERAL PROPERTY INFORMATION

The Midway (Nike Manor) housing area is located on the southwestern edge of the city of Kent, Wash. The housing area occupies 10.18 acres within the city limits of Kent. The site consists of 32 separate "Capehart"-style housing units with attached carports. Capehart is the model name given to these homes by the builder, National Homes. A playground and bus waiting shelter are also located on the property. The housing site is located on a triangular-shaped piece of property bounded by Jeffery Road to the north, Military Road to the east, and South 240th Street to the south.<sup>2</sup> The general slope of the property is to the northwest with a drop-off in front of the housing site and across Jeffery Road. A sewage lift station located to the north in a wooded area connects the housing units to the Kent municipal sewage system.

Figures 1 and 2 show the general location of the facility.

### 2.2 DESCRIPTION OF FACILITY

Figure 3 presents the site plan of the housing property.

#### Housing Units

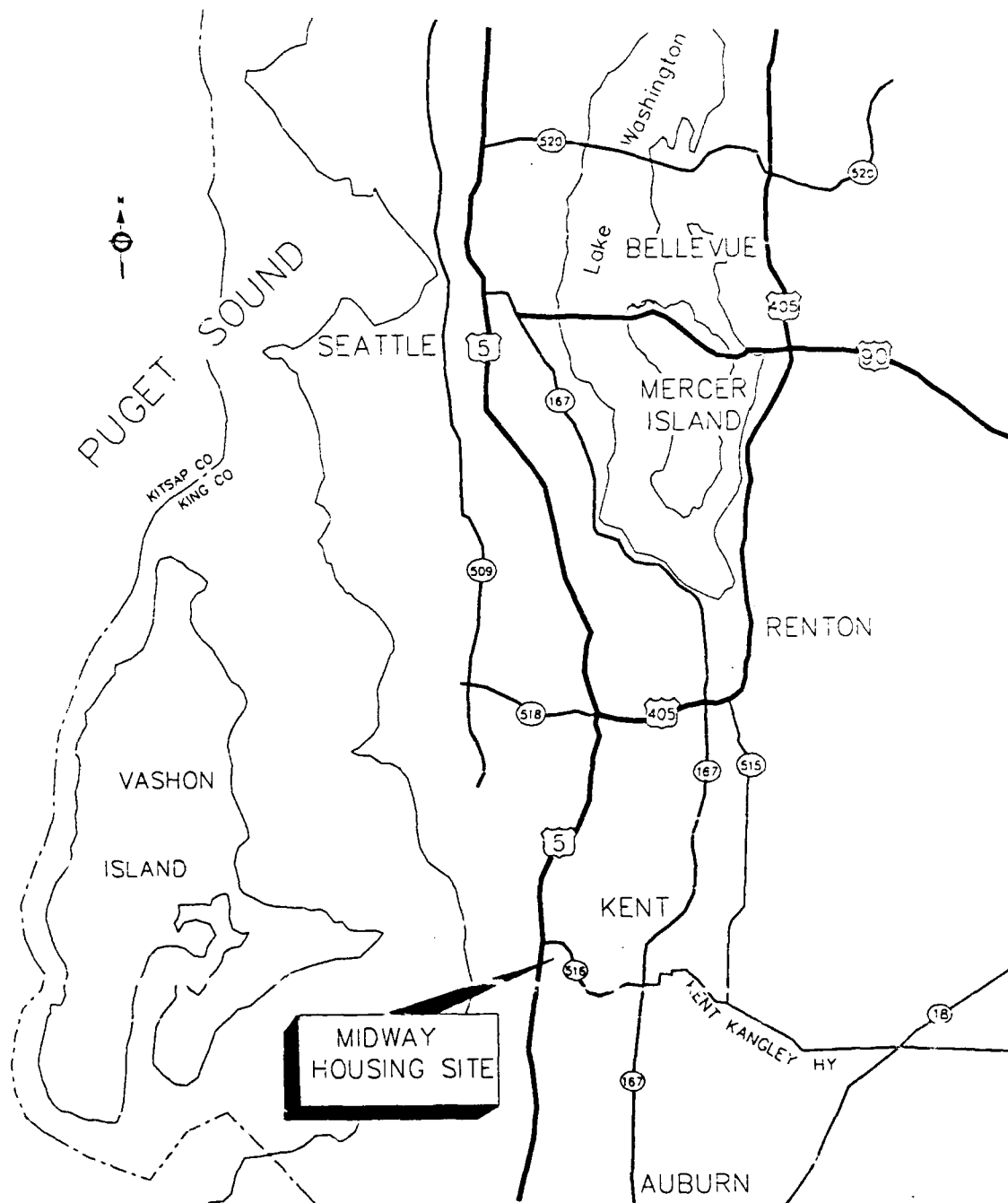
The housing area consists of 32 separate "Capehart"-style housing units, each having attached carports and storage sheds. The housing units include one two-bedroom house with 1,484 square feet; two three-bedroom houses with 1,737 square feet each; seven three-bedroom houses with 1,688 square feet each; and 22 three-bedroom houses with 1,426 square feet each. The buildings are constructed of concrete foundations with concrete slab floors that are overlaid with asphalt floor tile. Outside wall construction is 5/8-inch vertical plywood. Roofs are made of built-up tar paper and gravel.<sup>3</sup> Carports are covered with asbestos shake siding for fire retardation.

All units have separate fuel-oil forced-air heating facilities that are adequate for the climatic conditions for the area. Window air-conditioners are also provided.

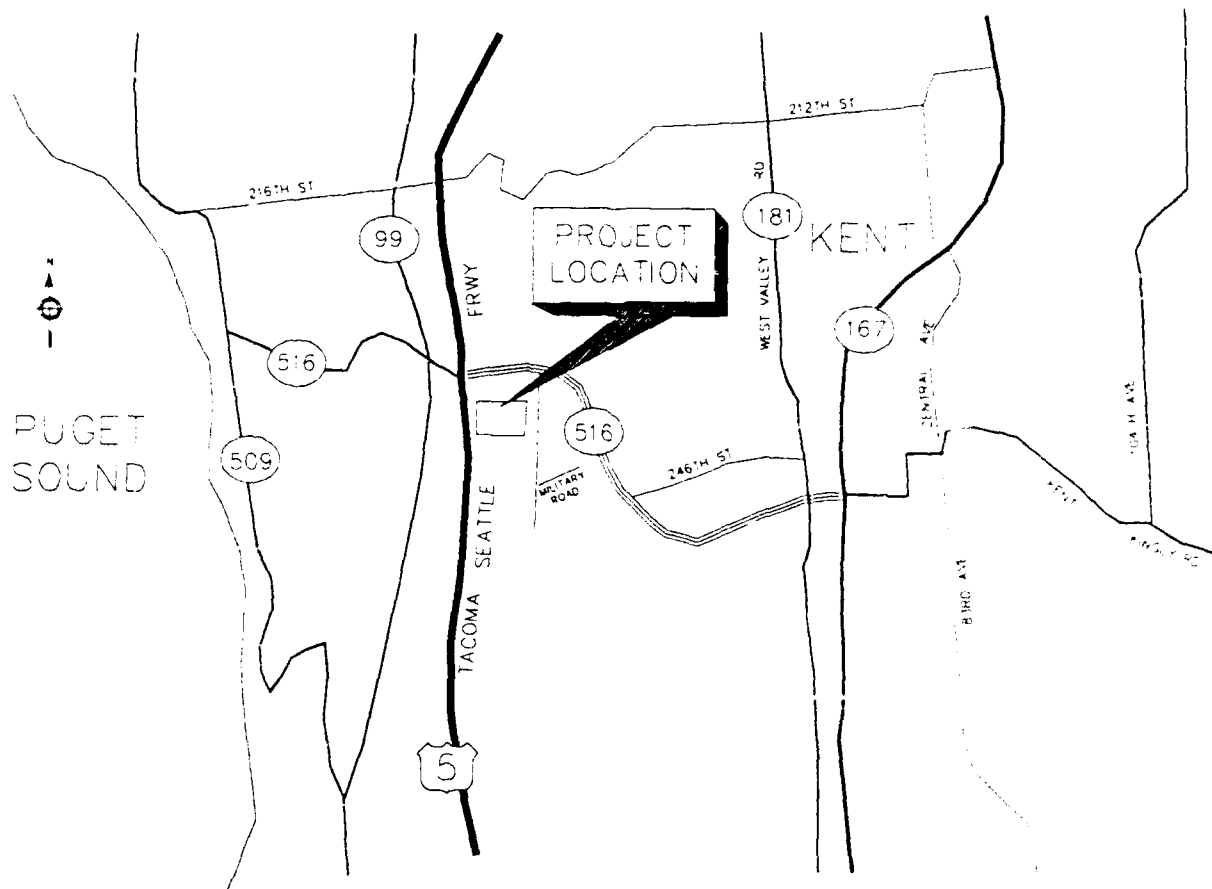
#### Utilities

Electrical service to the housing units is provided by a locally owned utility company which also owns the three pole-mounted electrical transformers located on-site. The transformers were replaced five years ago. Water and sanitary sewer facilities are provided by the town of Kent. Refuse pickup is furnished by a private contractor.





**FIGURE 1 Location Map of Washington Army Housing Facilities**



**FIGURE 2 Vicinity Map of Midway Nike Manor Army Housing Units**

#### **Fuel Storage**

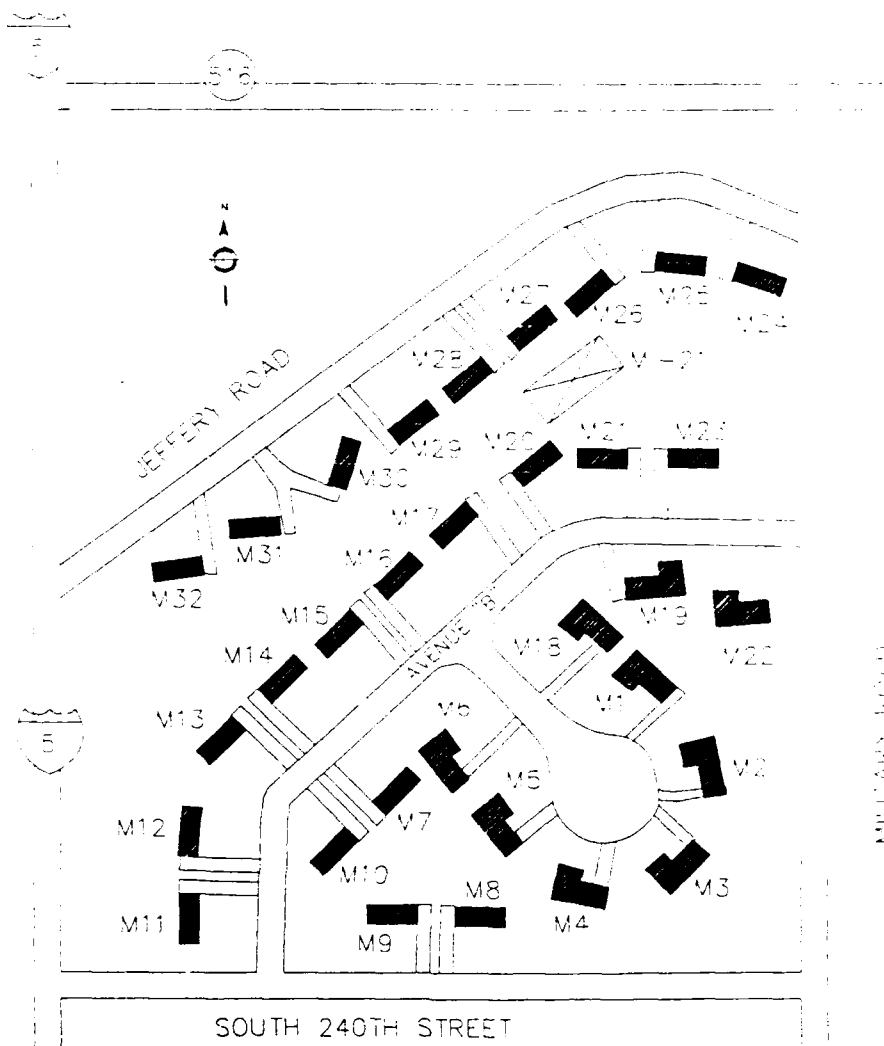
There are 30 500-gallon underground storage tanks located on the property for the storage of fuel oil. In addition, there are two 275-gallon above-ground fuel-oil storage tanks on the property. These above-ground tanks replaced original underground storage tanks, which had previously experienced water-intrusion problems.

#### **Storm Drainage System**

Storm drainage for the housing area is accomplished by runoff to open ditches.

#### **Other Permanent Structures or Property Improvements**

Also included on the property is a bus waiting shelter and a small playground area that is equipped with typical playground equipment. All units were taken off their original septic sewage systems and connected to city sewers in 1961. Insulation and weather stripping were added to all units during the fall of 1985.



**FIGURE 3 Site Plan Map of Midway Nike Manor Army Housing Units**

## **2.3 PROPERTY HISTORY**

### **2.3.1 Nike Defense Program and Typical Battery-Level Practices**

Generic information on the national Nike antiaircraft defense program has been compiled in two studies, one commissioned by the Army Corps of Engineers<sup>4</sup> and the other by the U.S. Army Toxic and Hazardous Materials Agency.<sup>5</sup> In both studies, independent contractors relied on information contained in unclassified documents related to the Nike surface-to-air missile program, including engineering drawings and specifications (for the facilities and the missiles themselves), interviews with Army personnel participating in the Nike program, and operations manuals and directives relating to the operations and maintenance of Nike facilities. Taken together, these two

reports represent the most complete assemblage of generic information on the Nike missile program from an environmental perspective. Salient points from both reports are condensed below.

At its zenith in the early 1960s, the Nike program included 291 batteries located throughout the continental United States. The program was completely phased out by 1976, with many of the properties sold to private concerns or excessed to state or local governments for nominal fees.

Nike Ajax missiles were first deployed in 1954 at installations throughout the continental United States, replacing, or in some cases augmenting, conventional artillery batteries and providing protection from aerial attack for strategic resources and population centers. Typically, Nike batteries were located in rural areas encircling the protected area. The Ajax was a two-stage missile using a solid-fuel booster rocket and a liquid-fuel sustainer motor to deliver a warhead to airborne targets.

The Ajax missile was gradually replaced by the Nike Hercules missile, introduced in 1958. Like the Ajax, the Hercules was a two-stage missile, but it differed from the Ajax in that its second stage was a solid-fuel rather than liquid-fuel power source and its payload often was a nuclear rather than conventional warhead. Ajax-to-Hercules conversions occurred between 1958 and 1961 and required little change in existing Nike battery facilities. A third-generation missile, the Zeus, was phased out during development and consequently was never deployed.

A typical Nike missile battery consisted of two distinct and separate operating units, the launch operations and the integrated fire control (IFC) operations. The two operating areas were separated by distances of less than two miles, with lines of sight between them for communications purposes. A third separate area was also sometimes part of the battery. This area was typically equidistant from the two battery operating sites and contained housing for married personnel assigned to the battery. Occasionally, these housing areas also contained battalion headquarters, which were responsible for a number of Nike batteries.

Depending on area characteristics and convenience, the housing areas were often reliant on the launch or IFC sites for utilities such as potable water, electrical power, and sewage treatment. In those instances, buried utility lines connected the housing area to one or both of the other battery properties. It is also possible, however, that housing areas were completely independent of the missile launcher and tracking operations. In those instances, the necessary utilities were either maintained on the housing site or purchased from the local community. In many localities, as the character of the land area around the housing units changed from rural to suburban or urban, communities extended utility services to the housing unit locations, in which case conversions from independent systems to community systems were made.

A large variety of wastes was associated with the operation and maintenance of Nike missile batteries. Normally encountered wastes included benzene, carbon tetrachloride, chromium and lead (contained in paints and protective coatings), petroleum hydrocarbons, perchloroethylene, toluene, 1,1,1-trichloroethane, 1,1,2-trichloroethane, and trichloroethylene. Because of the rural locations of these

batteries, and also because very few regulatory controls existed at that time, most of these wastes were managed "on-site." (Unused rocket propellants and explosives, however, would always have been returned to central supply depots and not disposed of on-site.) It is further conceivable that wastes generated at one of the Nike properties may have been transferred to its companion property for management or disposal.

Wastes related to missile operation and maintenance would not have been purposely transferred from a battery operating area to a housing area with no facilities for waste management or disposal. In some instances, however, the sewage treatment facilities for all Nike battery properties were located at the housing area; that possibility cannot be automatically ignored. Finally, where housing areas received various utilities from either of the operating areas, it is also possible that wastes disposed of on those other properties may have migrated to the housing area via the buried utility lines. And since decommissioning of the Nike batteries did not normally involve removal of buried utility or communication lines, any such contaminant migration is likely to have gone unnoticed.

### 2.3.2 Midway Housing Units

The Midway housing area consists of 10.18 acres of fee-owned land acquired during 1956; 32 "Capehart"-style housing units were built in 1958. Capehart is the model name given to these homes by the builder, National Homes. This facility was originally developed as housing for military personnel assigned to the Nike battery, part of the Seattle Defense Area. In April 1965, responsibility for the housing area was transferred to nearby Fort Lewis. Prior to 1965, the property was under the control of the former Repairs and Support Installation at Fort Lawton.<sup>6</sup> Since decommissioning of the Nike battery, the housing units have been occupied by members of all services (Army, Navy, Air Force, and Coast Guard).

Currently, the housing units are occupied by enlisted personnel and noncommissioned officers and their dependents. The housing area included in this PA is not believed to have ever been involved in Nike site-related activities. It has always been used as housing units for military personnel, with no industrial activities occurring on-site.

Since the initial property development in 1958, no other permanent structures have been added, and none of the original structures has been razed.

## 2.4 ENVIRONMENTAL SETTING AND SURROUNDING LAND USE

The Midway housing area is located just inside the city limits of Kent, Wash. King County extends approximately 50 miles in an east-west direction and 40 miles in a north-south direction, with Puget Sound making up its western boundary. King County includes the greater Seattle metropolitan area, which includes Kent. Kent is approximately nine miles south of Seattle. The population of King County as determined in the 1980 census was 1,269,749.<sup>7</sup>

The Midway stand-alone housing site is completely surrounded by residential areas. The Sunnycrest Elementary School is located nearby. All structures in the immediate area of the housing site are served by public water and sewer utilities.

The mean monthly temperature in the Seattle area varies from 38°F in January to 65°F in July. The prevailing wind direction in Seattle is from the south during most of the year, and southeasterly from October to December. The Midway housing area lies within the lowlands area surrounding Puget Sound and receives approximately 41 inches per year of rainfall. December is the wettest month and July or August the driest. Thunderstorms are uncommon and average only about five in number per year.

The Midway Landfill is located approximately one-half mile to the west of the housing site. This landfill, located in an old gravel quarry, was operational from 1969 to 1983. Large, unknown quantities of solvents, inorganic and organic chemicals, heavy metal wastes, and dredge and fill materials containing aromatic and chlorinated hydrocarbons were disposed of at this landfill. No protective layer was placed between the landfill and the local groundwater, which is believed to flow in a southwesterly direction. Groundwater analyses have confirmed releases to groundwater of organics and heavy metals. About four years ago, this landfill (I.D. No. WA D980638910) was designated a superfund site by the U.S. Environmental Protection Agency, Region 10 (Seattle). In addition, beginning in 1984, the City of Seattle installed several gas monitoring wells in the soil adjacent to the landfill. Elevated levels of methane gas have been detected. Subsequent studies have revealed the presence of elevated methane concentrations in the soil up to 2,500 feet away from the landfill, mostly east and southeast of the landfill. Extraction wells have been installed, and, based on verbal reports, have been successful in reducing the methane in the soil to acceptable levels.<sup>8</sup>

## 2.5 GEOLOGIC AND HYDROLOGIC SETTINGS

The Midway stand-alone housing area is located on the Des Moines drift plain in the Puget Sound lowland. This drift plain merges eastward with glaciated foothills of the Cascade Range. The foothills are protruding parts of a Tertiary bedrock surface that descends westward beneath quarternary deposits more than a thousand feet thick. Rocks of Tertiary age include sedimentary and volcanic rocks of the Puget Group; intrusive rocks; an assemblage of andesitic volcanic rocks; and Homer Bluff formation. Virtually all Tertiary rocks are either too fine-grained or too highly altered to yield groundwater at rates as high as 50 gallons per minute (gal/min).

Quarternary deposits are the chief source of groundwater in the area. The Salmon Springs drift and Vashon advance outwash contain the most productive aquifers beneath the Des Moines drift plain. The Salmon Springs drift is a sequence of sand, gravel, clay, and till. The formation is nearly 400 feet thick beneath a large part of the Des Moines drift plain; its base is close to or slightly below sea level. Advance outwash underlying the Des Moines drift plain consists predominantly of sand, with some layers of pebble-cobble gravel. Both units occupy much of the subsurface between the overlying Vashon till and sea level. The individual water-bearing zones are irregularly distributed, both vertically and laterally, but most of them occur in the interval from slightly below sea level to about 200 feet above. Many wells less than 400 feet deep have obtained

yields ranging from 300 to 2,000 gal/min. Pleistocene drift underlying the Salmon Springs drift yields less water. A sectional cut running generally east-west from Puget Sound to the Duwamish River Valley passes close to the Midway Nike Manor housing area.<sup>9</sup>

### **3 ENVIRONMENTALLY SIGNIFICANT OPERATIONS**

#### **3.1 UNDERGROUND FUEL-OIL STORAGE TANKS**

There are presently 30 500-gallon underground tanks that contain fuel oil for the forced-air furnaces. Originally there were 32 underground tanks at this site; however, about three years ago, two tanks at units #30 and 32 were replaced because of heating problems. These problems were traced to water intrusion in the fuel-oil storage tanks. At the time of failure, the two tanks were replaced with smaller 275-gallon above-ground storage tanks. The two original underground tanks remain in place at these two units, however. It is not known whether any product was lost from these tanks prior to discovery of water-intrusion problems.

#### **3.2 UNDERGROUND SEPTIC TANKS**

Originally, the units were equipped with 750-gallon septic tanks that were located behind each housing unit. In 1961, the septic systems were abandoned and the units were connected to the municipal sewer system. There are no details available on the abandonment of the septic tanks, which are believed to have been left in place. There is no documentation of problems with the septic systems during the period of their use (1958-1961).

#### **3.3 ASBESTOS CONSTRUCTION MATERIAL**

Asbestos shake siding is presently used on the carports of each of the 32 housing units. The floor tiles in the housing units may contain asbestos material. All floor tiles and siding were found to be in good shape.



#### 4 KNOWN AND SUSPECTED RELEASES

No major releases or impacts on the environment have occurred at the Midway housing area. No hazardous wastes or hazardous materials are stored on site. Although this housing area was constructed in support of a Nike missile battery, no Nike missile-related wastes were ever delivered to this property. Furthermore, this housing area was independent of Nike operational areas with respect to water, sewer, and electrical utilities. Since decommissioning of the Nike battery in the early 1970s, the site has been used as a family housing site for active-duty U.S. military personnel and their dependents in the Seattle and Tacoma, Wash., area. No industrial activities have ever occurred on the property.

Two of the original underground fuel storage tanks were replaced with above-ground tanks after developing water intrusion problems. There is no documentation of releases of petroleum products from these tanks, which are believed to have been abandoned in place. There is also no documentation of releases from any of the 30 underground tanks which remain in service.

## 5 PRELIMINARY ASSESSMENT CONCLUSIONS

Although these housing units were originally developed in support of a Nike missile battery, no wastes associated with the operation or maintenance of the battery were ever delivered to or managed at this housing property. Furthermore, the housing facility was completely independent of the battery's launch and fire-control operations with respect to water, sewer, and electrical utilities. No documentary evidence was found of utility connections between this housing site and other properties comprising the missile battery that it served.

The aging underground heating oil storage tanks represent a potential for environmental impact. Because no attempt has been made to determine the integrity of any of these tanks, their continued use represents an unknown potential for environmental release. Two of these tanks suffered water intrusion and have been abandoned. Thirty remain in service.

Floor tiles, which may contain asbestos, were all in good condition. Asbestos-containing exterior siding on the carports of the houses was also found to be in good condition.

## 6 RECOMMENDATIONS

The Midway housing area presents no imminent or substantial threat to human health or the environment. There is no evidence to suggest that hazardous or toxic constituents have ever been released from this property. No immediate remedial action is, therefore, warranted for the site.

The following action is recommended before release of this property:

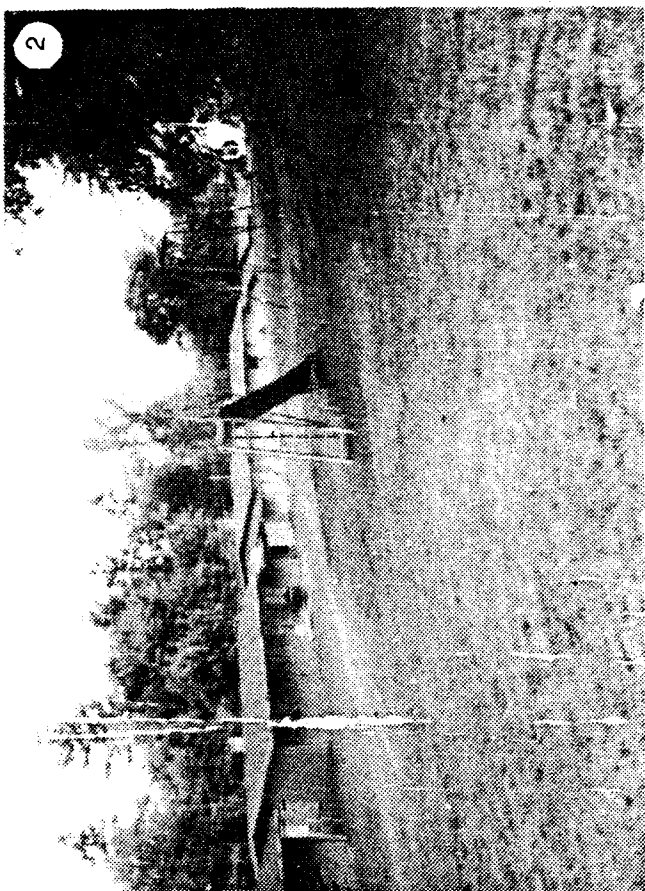
- Remove and replace the 32 underground fuel-storage tanks; sample soils in the tank excavations for petroleum contamination and remediate any problems encountered.

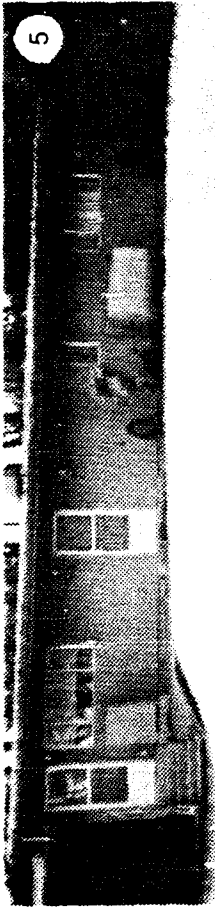
This recommendation assumes that this property will most likely continue to be used for residential housing.

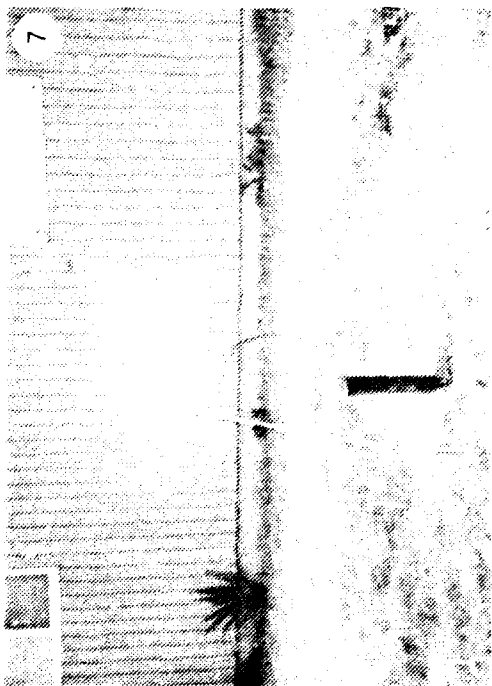
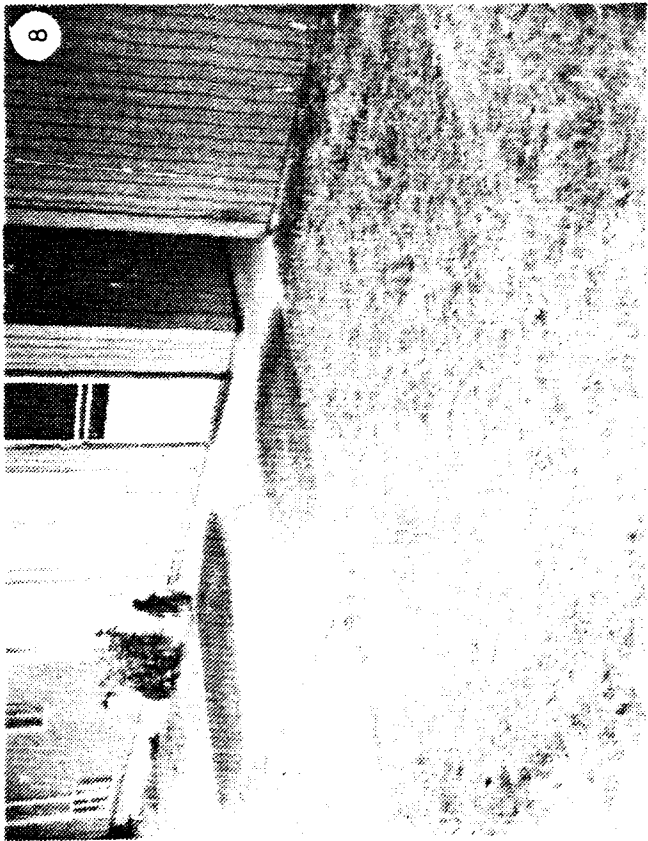
## REFERENCES

1. *Base Realignments and Closures*, Report of the Secretary's Commission (Dec. 1988).
2. Corps of Engineers Drawing No. 71-05-01 (Feb. 18, 1958).
3. Seattle Defense Area Capehart Family Housing, Drawing Index and Schedules, July No. 45-02-03 (1956).
4. U.S. Army Corps of Engineers, Huntsville Div., *Investigation of Former Nike Missile Sites for Potential Toxic and Hazardous Waste Contamination*, Law Engineering and Testing Co., LEG-Government Services Division, LEG Job #601 (March 1986).
5. U.S. Army Toxic and Hazardous Materials Agency, *Historical Overview of the Nike Missile System*, prepared by B.N. McMaster et al., Environmental Science and Engineering, Inc., for USATHAMA Assessments Div., Aberdeen Proving Ground, Md. (Dec. 1984).
6. Memorandum to Commander, Forces Command, Attn: FCEN-CDP, Fort McPherson, Ga.
7. *State Farm Atlas*, King County.
8. *Midway Landfill Fact Sheet and associated Updates*, State of Washington, Dept. of Ecology, Olympia, Wash. (Jan. 9, Jan. 20, Jan. 28, and Feb. 6, 1986).
9. Luzier, J.E., *Geology and Groundwater Resources of Southwestern King County, Washington*, U.S. Geological Survey, Water Supply Bulletin No. 18 (1969).

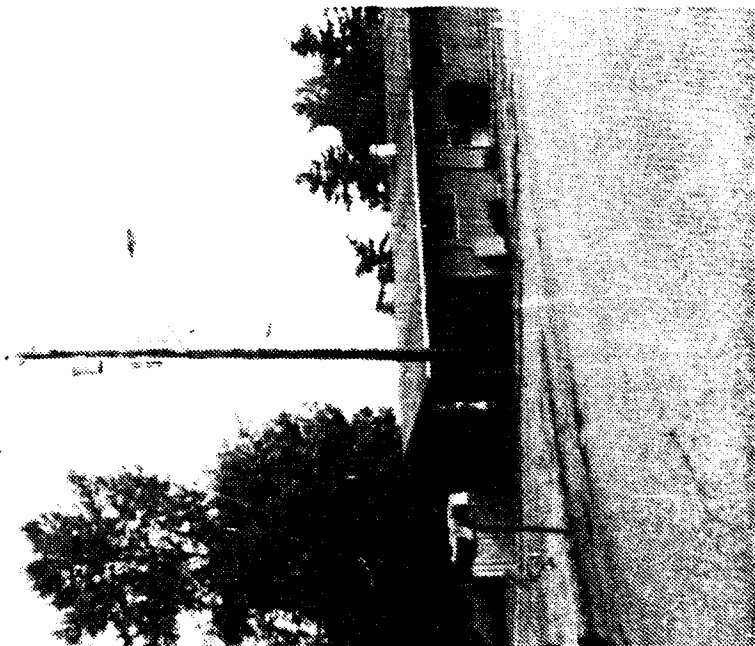
**APPENDIX:**  
**PHOTOGRAPHS OF MIDWAY HOUSING FACILITY**  
**AND SURROUNDING LAND**



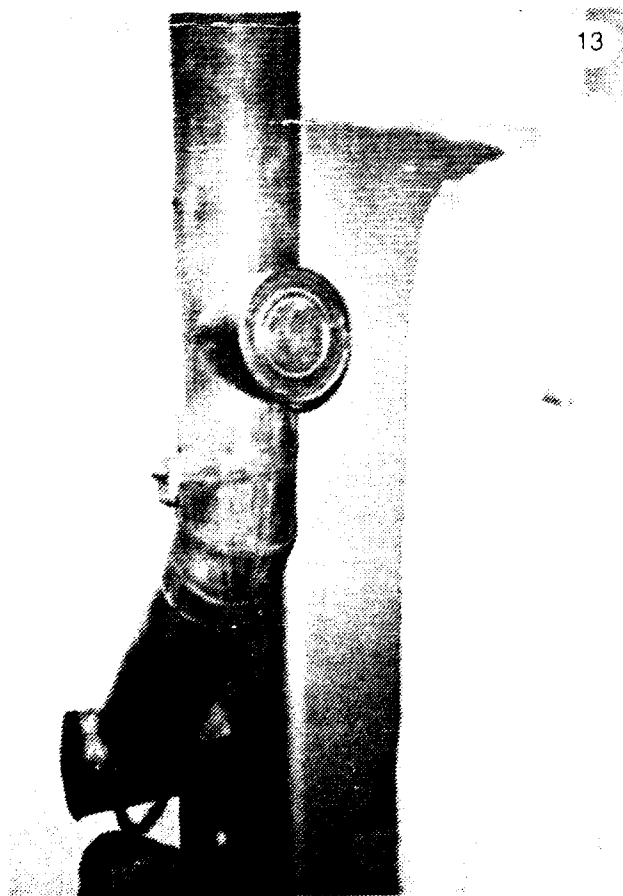
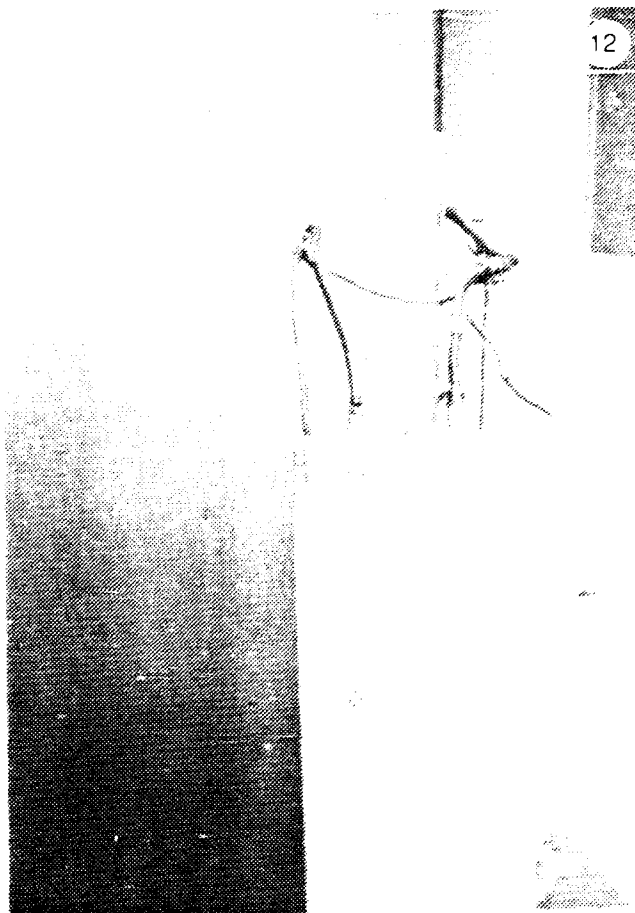




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## IDENTIFICATIONS OF PHOTOGRAPHS

1. Some units at this site.
2. Rear view of the housing units; the play area, MI-21, located between rows of houses.
3. Southwest view of Avenue A in the housing area; a storm water drain can be seen at the lower left.
4. A gravel drainage ditch shown at center along entire length of the view.
5. Above-ground fuel-oil storage tank, next to the wall of the housing unit; in the foreground is the gravel drainage ditch.
6. Closer view of above-ground fuel-oil storage tank.
7. The inlet pipe for an underground fuel-oil storage tank; underground tanks that leaked oil were abandoned in place, and above-ground tanks were installed for storage of fuel oil; thus, both underground and above-ground tanks are in use at this site.
8. The ground at the rear of this housing unit appears different from the immediate surroundings, suggestive of a buried septic tank at the location; whether the tank is still there could not be ascertained.
9. Electric transformer atop a utility pole; the public utility company providing electricity to the site owns the transformers.
10. The western edge of the housing area; Jeffery Road shown here is blocked off close to I-5.
11. An example of a hot water tank with no insulation.
12. Another example of an uninsulated hot water tank; this tank is smaller than the tank shown in Fig. 11.
13. Insulated hot water tank; the fiberglass insulation material shows evidence of cracking; furnace and vent pipe are also seen to the left of the hot water tank.